Metals supported in polysaccharide-based materials: Promising catalysts devices

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Abstract
The use of metals as catalysts in a wide scope of organic reactions is a well-established strategy that has been employed efficiently for more than a century. Among several possibilities involving metallic compounds, the metallic nanoparticles have attracted particularly attention due to their physico-chemical properties. These properties differ substantially from those of bulk metals as a result of a larger number of atoms on the nanoparticle surface compared to those of their inner volume. This feature expands the number of catalytic sites and, as a consequence, enhances the efficiency of such particles in catalytic. Although, the applicability of metal nanoparticles can show some drawbacks and limitations, mainly due to the tendency of aggregation and precipitation presented by these particles, especially in aqueous medium. One of the most promising strategies to solve this issue consists in the development of solid supports to immobilize and stabilize the nanoparticles Recent studies revealed that these supports could provide a platform for the mechanical, thermal, and chemical stabilization of metal nanoparticles. As additional benefits, the nanoparticles supported into solid supports are easily recovered and recycled. These characteristics are expected to be highly attractive from both academic and industrial perspectives. Furthermore, such catalyst enables chemical processes that in agreement with some important principles of green chemistry Polymeric matrices have been extensively utilized as solid support for numerous metal nanoparticles due to their flexibility regarding morphology, dimension, mechanical properties, hydrophobic/hydrophilic balance, fabrication method, etc. In this lecture, the designing of different polymeric-based materials are exploited as supporting devices for different metal specimens and their use as catalyst in organic reactions is investigated.